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Department of Environmental Quality
State Air Program

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knelson@pmt.org
1051 Hansen Avenue
Burley, ID 83318

March 24, 2008

Mr. William Rogers
Idaho Department of Environmental Quality
1410 North Hilton Ave
Boise, ID 83706

RE: Request to Modify PTC, P-2007.0100, High Desert Milk, Burley, Idaho

Dear Mr. Rogers:

Please find enclosed, one copy of our application to amend the Permit to Construct (Permit No. P-2007.0100) issued November 7, 2007 for our Burley Facility. Information regarding these requested changes are detailed in the attached report prepared by our consultant, Millennium Science & Engineering.

Pursuant to Idaho Rules (IDAPA 58.01.01.123), I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the attached documents are true, accurate, and complete.

Please feel free to call me at (208) 878-6455 or our consultant Mr. Troy Riecke at (208) 345-8292 if you have any questions.

Sincerely,

Karl Nelson
General Manager

cc: Troy Riecke – Millennium Science & Engineering, Inc.
Steve White – High Desert Milk



Millennium Science & Engineering, Inc.

1605 N. 13th Street
Boise, Idaho 83702
Phone: (208) 345-8292
Fax: (208) 344-8007

March 21, 2008

Mr. Karl Nelson
High Desert Milk, Inc.
1051 Hansen Ave.
Burley, Idaho 83318

Re: Application to Amend Permit to Construct (P-2007.0100, Issue Date 11/07/07),
High Desert Milk, Inc., Milk Processing Plant, 1033 Idaho Avenue, Burley, Idaho

Dear Mr. Nelson:

As requested, Millennium Science & Engineering, Inc. (MSE) has prepared this application to amend the Permit to Construct (PTC) for your milk processing plant in Burley, Idaho.

Proposed Equipment Changes

The following equipment changes are included in this request to amend the facility's PTC:

- 1.) Alternate equipment installation (source ID# P104 and P105): Two Superior Boiler Works model 4000 boilers each rated at 33.475 MMBtu/hr heat input capacity will be installed at the plant instead of the equipment originally specified. The original equipment specifications called for two Superior Boiler Works model 7500 boilers each with rated heat input capacity of 62.766 MMBtu/hr. This equipment replacement will reduce potential emissions from the facility.
- 2.) Alternate equipment installation (source ID# GEN): One Cummins 900DQFAC generator set rated at 1490 HP will be installed at the plant instead of the originally specified equipment. The original equipment specifications called for one Cummins 500DFEK generator set rated at 755 HP.

The boiler replacement with smaller equipment is exempt from PTC requirements since it will reduce potential emissions and will not cause an increase in the ambient impact. It is our understanding that the proposed boilers are expected to be delivered to the site for installation on March 24, 2008. The proposed emergency generator replacement would normally also be exempt from PTC requirements (it is a Category II Exempt Source listed in IDAPA 58.01.01.222.d), but due to the pre-permit construction approval process utilized for this project, the Idaho Department of Environmental Quality (IDEQ) has indicated that High Desert Milk must request a permit revision to allow the proposed emergency generator modification.

Updated Emission Rates

Boilers (P104 and P105)

Emission rates for the proposed replacement boilers were calculated utilizing the vendor reported heat input capacity and standard EPA AP-42 emission factors for boilers combusting natural gas. Emission calculation tables for these boilers along with equipment specifications are located in Attachment 1. The calculated emissions for the proposed boilers are lower than the calculated emissions for the original boilers for all pollutants.

Emergency Generator (GEN)

Emission rates for the proposed replacement emergency generator were calculated utilizing vendor supplied emission factors (see Attachment 1). These factors were provided for a variety of generator operating conditions; for purposes of calculating worst-case emissions we utilized the "Full-Standby" emission factors and conservatively applied them to the full horsepower rating of 1490 HP to calculate emission rates. Emergency generator emission rates for pollutants with annual averaging periods were reduced by a factor of 500 hours / 8760 hours to account for limited hours of operation. Emission calculations and vendor supplied equipment information are included as Attachment 1.

The calculated emergency generator emission rates for PM₁₀, SO_x, and NO_x increased and the emission rates for CO and toxic air pollutants (TAPs) decreased. While the increase in emission rates was expected due to the increased electricity generating capacity of the proposed generator, the decrease in emission rates for CO and TAPs was somewhat of a surprise. The reason for the decrease in CO emissions was due to our use of a lower emission factor (based on the "Full-Standby" operations) in the updated calculations. The decrease in TAPs emissions is a result of selecting a lower fuel consumptive rate for the proposed generator upgrade. In the original application we were extremely conservative and used the equipment's maximum rated fuel throughput capacity as listed in the specifications. When we revisited the equipment calculations for the proposed equipment replacement we determined that a more representative fuel rating was the fuel consumption at the "Full Standby" operating condition. This resulted in a lower fuel consumption rate than what was used for the smaller generator-set included in the original application.

Emissions Comparison

While estimated emissions associated with the proposed emergency generator will increase for some pollutants, when compared to the existing PTC, the overall emissions associated with the planned equipment modification will decrease (see updated emission inventory in Attachment 2). The table below summarizes estimated emissions associated with the permitted equipment and the proposed replacement equipment. As can be seen, the proposed equipment modification will result in a net decrease in air pollutant emission rates.

Air Pollutant Emission Rates: Comparison of Existing and Proposed Equipment

Pollutant	Existing Equipment				Proposed Equipment				Change
	Boiler #1 P104 (ton/yr)	Boiler #2 P105 (ton/yr)	Emergency Generator (ton/yr)	Total (ton/yr)	Boiler #1 P104 (ton/yr)	Boiler #2 P105 (ton/yr)	Emergency Generator (ton/yr)	Total (ton/yr)	
PM ₁₀	2.0	2.0	0.1	4.2	1.1	1.1	0.1	2.3	-1.8
SO ₂	0.2	0.16	0.1	0.4	0.1	0.09	0.1	0.3	-0.1
NO _x	27.0	27.0	2.0	55.9	14.7	14.7	3.3	32.6	-23.3
CO	22.6	22.6	1.1	46.4	12.3	12.3	0.5	25.1	-21.3
VOC	1.5	1.5		3.0	0.8	0.8		1.6	-1.4
Lead	1.3E-04	1.3E-04		0.0	7.3E-05	7.3E-05		0.0	0.0
Acetaldehyde			9.0E-05	0.0			5.2E-05	0.0	0.0
Acrolein			4.9E-04	0.0			2.8E-04	0.0	0.0
Arsenic	4.7E-05	4.7E-05		0.0	2.6E-05	2.6E-05		0.0	0.0
Benzene	5.0E-04	5.0E-04	2.8E-03	0.0	5.0E-04	5.0E-04	1.6E-03	0.0	0.0
Benzo(a)pyrene	2.8E-07	2.8E-07	9.2E-07	0.0	2.8E-07	2.8E-07	5.3E-07	0.0	0.0
Cadmium	2.6E-04	2.6E-04		0.0	1.4E-04	1.4E-04		0.0	0.0
Fluorene	6.6E-07	6.6E-07	8.0E-04	0.0	6.6E-07	6.6E-07	4.6E-04	0.0	0.0
Formaldehyde	1.8E-02	1.8E-02	2.8E-04	0.0	9.6E-03	9.6E-03	1.6E-04	0.0	0.0
Naphthalene	1.4E-04	1.4E-04	8.2E-03	0.0	1.4E-04	1.4E-04	4.7E-03	0.0	0.0
Nickel	5.0E-04	5.0E-04		0.0	2.7E-04	2.7E-04		0.0	0.0
Toluene	8.0E-04	8.0E-04	1.8E-02	0.0	8.0E-04	8.0E-04	1.0E-02	0.0	0.0
Total PAH			7.6E-04	0.0			4.3E-04	0.0	0.0
Xylenes			1.2E-02	0.0			6.9E-03	0.0	0.0

Air Dispersion modeling

Air dispersion modeling was performed using updated emission rates for criteria air pollutants PM₁₀ and NO_x. Emission rates for SO_x and lead were below the modeling thresholds listed in Table 1 of the State of Idaho Air Quality Modeling Guidelines and were not evaluated. Estimated emission rates for CO and the TAPs: arsenic, cadmium, formaldehyde, and nickel decreased from the original evaluation for all sources and were therefore not re-evaluated. MSE prepared a Revised Ambient Impact Assessment and has amended the appropriate PTC Application forms (included as Attachments 3 and 4, respectively). Based on the results of the updated Ambient Impact Assessment, the proposed equipment changes will not cause exceedance of any National Ambient Air Quality Standards (NAAQS).

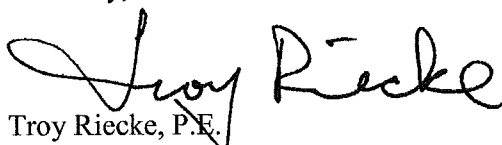
Requested Permit Changes

Only one change to the permit is necessary to accommodate these proposed equipment changes. Revise Permit Condition 3.7 to reduce the allowable fuel combustion from 61,535 scf/hr (539.1 MM scf/yr) to 33,475 scf/hr (293.24 MM scf/yr) for each boiler due to the reduced fuel consumption requirements of the proposed smaller boilers. This permit modification is administrative since it is only needed for consistency with the published equipment rating, it is not necessary to prevent exceedance of NAAQS.

Mr. Karl Nelson
March 21, 2008
Page 4 of 4

We appreciate the opportunity to assist you with this project. If you require additional information please contact the undersigned at (208) 345-8292.

Sincerely,

A handwritten signature in black ink, reading "Troy Riecke". The signature is fluid and cursive, with the first name "Troy" and last name "Riecke" clearly distinguishable.

Troy Riecke, P.E.
Environmental Engineer

R1985.doc

Attachments:

- Attachment 1 – Emission Calculations and Vendor Supplied Equipment Information
- Attachment 2 – Updated Emission Inventory
- Attachment 3 – Revised Ambient Impact Assessment
- Attachment 4 – PTC Application Forms

Attachment 1

Emission Calculations and Vendor Supplied Equipment Information

Criteria Air Pollutant Emissions Boiler #1 (P104)

Combustion Source Characteristics		Stack Data	
Boiler Manufacturer	Superior Boiler Works, Inc.	Stack Height (ft)	38.0
Burner Model	Super Seminole 4000 (or Equivalent)	Stack Diameter (ft)	4.00
Input Heat Capacity (BTU/hr)	33,475,000	Exit Gas Temperature (°F)	350
Fuel	Natural Gas	Wet Actual Flow Rate (acfm)	10,548
Heating Value (BTU/scf)	1,000	Wet Standard Flow Rate (wscfm)	5,919
Max Hourly Fuel Consumption (scf/hr)	33,475	Dry Standard Flow Rate (dscfm)	4,859
Annual Fuel Consumption (scf/yr)	293,241,000	Grain Loading Flow Rate (dscfm)	6,590
Site Information		Stack Velocity (m/s)	4.26
		Fd (dscf stack gas/BTU)	0.00871
		Fw (wscf stack gas/BTU)	0.01061
Burley Barometric Pressure (mm Hg)	654.30		

Criteria Pollutants						
Pollutant	Pollutant Source	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (TPY)	Potential Emissions (g/s)
PM ₁₀	NG Combustion	7.6	lb/10 ⁶ scf	0.254	1.1	0.032
SO ₂	NG Combustion	0.6	lb/10 ⁶ scf	0.020	0.1	0.003
NO _x	NG Combustion	100	lb/10 ⁶ scf	3.348	14.7	0.422
CO	NG Combustion	84	lb/10 ⁶ scf	2.812	12.3	0.354
VOC	NG Combustion	5.5	lb/10 ⁶ scf	0.184	0.8	0.023
Lead	NG Combustion	0.0005	lb/10 ⁶ scf	1.67E-05	0.0	2.11E-06

Non-Criteria Pollutants with Significant Threshold						
Pollutant	Pollutant Source	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (TPY)	Potential Emissions (g/s)
PM	NG Combustion	See PM ₁₀	See PM ₁₀	0.254	1.114	3.21E-02
Beryllium	NG Combustion	<1.2E-5	lb/10 ⁶ scf	4.02E-07	0.000	5.06E-08
Mercury	NG Combustion	2.60E-04	lb/10 ⁶ scf	8.70E-06	0.000	1.10E-06

PM Grain Loading Standard ^b					
Pollutant	Pollutant Source	Potential Emissions (lb/hr)	Grain Load @ 3% Oxygen (gr/dscf)	PM Grain Standard ^b (gr/dscf)	Meets Standard?
PM	NG Combustion	0.254	0.005	0.015	yes

Notes:

(a) Emission factors from AP-42 Chapter 1.4, "Natural Gas Combustion", unless otherwise noted.

(b) IDAPA 58.01.01.677

Toxic Air Pollutant Emissions Boiler #1 (P104)

Combustion Source Characteristics	
Boiler Manufacturer	Superior Boiler Works, Inc.
Burner Model	Super Seminole 4000 (or Equivalent)
Input Heat Capacity (BTU/hr)	33,475,000
Fuel	Natural Gas
Heating Value (BTU/scf)	1,000
Max Hourly Fuel Consumption (scf/hr)	33,475
Annual Fuel Consumption (scf/yr)	293,241,000

Site Information	
Burley Barometric Pressure (mm Hg)	654.18

Stack Data	
Stack Height (ft)	38.0
Stack Diameter (ft)	4.00
Exit Gas Temperature (°F)	350
Wet Actual Flow Rate (acfm)	10,548
Wet Standard Flow Rate (wscfm)	5,919
Dry Standard Flow Rate (dscfm)	4,859
Grain Loading Flow Rate (dscfm)	6,590
Stack Velocity (m/s)	4.26
Fd (dscf stack gas/BTU)	0.00871
Fw (wscf stack gas/BTU)	0.01061

Toxic Air Pollutants					
Pollutant	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (g/s)	Emission Limit ^b (lb/hr)
Arsenic	2.00E-04	lb/10 ⁶ scf	6.70E-06	8.44E-07	1.50E-06
Barium	4.40E-03	lb/10 ⁶ scf	1.47E-04	1.86E-05	3.30E-02
Benzene	2.10E-03	lb/10 ⁶ scf	7.03E-05	8.86E-06	8.00E-04
Beryllium	<1.2E-5	lb/10 ⁶ scf	4.02E-07	5.06E-08	2.80E-05
Benzo(a)pyrene	<1.2E-6	lb/10 ⁶ scf	4.02E-08	5.06E-09	2.00E-06
Bis (2-ethylhexyl)phthalate	FNA	lb/10 ⁶ scf	FNA	FNA	2.80E-02
Cadmium	1.10E-03	lb/10 ⁶ scf	3.68E-05	4.64E-06	3.70E-06
Chromium	1.40E-03	lb/10 ⁶ scf	4.69E-05	5.90E-06	3.30E-02
Cobalt	8.40E-05	lb/10 ⁶ scf	2.81E-06	3.54E-07	3.30E-03
Copper	8.50E-04	lb/10 ⁶ scf	2.85E-05	3.59E-06	3.33E-01
Dibutylphthalate	FNA	lb/10 ⁶ scf	FNA	FNA	6.70E-02
Dichlorobenzene	1.20E-03	lb/10 ⁶ scf	4.02E-05	5.06E-06	2.00E+01
Ethylbenzene	FNA	lb/10 ⁶ scf	FNA	FNA	2.90E+01
Fluorene	2.80E-06	lb/10 ⁶ scf	9.37E-08	1.18E-08	1.33E-01
Formaldehyde	7.50E-02	lb/10 ⁶ scf	2.51E-03	3.16E-04	5.10E-04
Hexane	1.80E+00	lb/10 ⁶ scf	6.03E-02	7.59E-03	1.20E+01
Manganese	3.80E-04	lb/10 ⁶ scf	1.27E-05	1.60E-06	3.33E-01
Mercury	2.60E-04	lb/10 ⁶ scf	8.70E-06	1.10E-06	3.00E-03
Molybdenum	1.10E-03	lb/10 ⁶ scf	3.68E-05	4.64E-06	3.33E-01
Napthalene	6.10E-04	lb/10 ⁶ scf	2.04E-05	2.57E-06	3.33E+00
Nickel	2.10E-03	lb/10 ⁶ scf	7.03E-05	8.86E-06	2.70E-05
Pentane	2.60E+00	lb/10 ⁶ scf	8.70E-02	1.10E-02	1.18E+02
Phenol	FNA	lb/10 ⁶ scf	FNA	FNA	1.27E+00
Selenium	<2.4E-5	lb/10 ⁶ scf	8.03E-07	1.01E-07	1.30E-02
Toluene	3.40E-03	lb/10 ⁶ scf	1.14E-04	1.43E-05	2.50E+01
Vanadium	2.30E-03	lb/10 ⁶ scf	7.70E-05	9.70E-06	3.00E-03
o-Xylene	FNA	lb/10 ⁶ scf	FNA	FNA	2.90E+01
Zinc	2.90E-02	lb/10 ⁶ scf	9.71E-04	1.22E-04	6.67E-01

Notes:

(a) Emission Factors from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) IDAPA 58.01.01.585 and 586

* FNA - Factor Not Available

Criteria Air Pollutant Emissions Boiler #2 (P105)

Combustion Source Characteristics		Stack Data	
Boiler Manufacturer	Superior Boiler Works, Inc.	Stack Height (ft)	38.0
Burner Model	Super Seminole 4000 (or Equivalent)	Stack Diameter (ft)	4.00
Input Heat Capacity (BTU/hr)	33,475,000	Exit Gas Temperature (°F)	350
Fuel	Natural Gas	Wet Actual Flow Rate (acfm)	10,548
Heating Value (BTU/scf)	1,000	Wet Standard Flow Rate (wscfm)	5,919
Max Hourly Fuel Consumption (scf/hr)	33,475	Dry Standard Flow Rate (dscfm)	4,859
Annual Fuel Consumption (scf/yr)	293,241,000	Grain Loading Flow Rate (dscfm)	6,590
Site Information		Stack Velocity (m/s)	4.26
		Fd (dscf stack gas/BTU)	0.00871
		Fw (wscf stack gas/BTU)	0.01061
Burley Barometric Pressure (mm Hg)	654.30		

Criteria Pollutants						
Pollutant	Pollutant Source	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (TPY)	Potential Emissions (g/s)
PM ₁₀	NG Combustion	7.6	lb/10 ⁶ scf	0.254	1.1	0.032
SO ₂	NG Combustion	0.6	lb/10 ⁶ scf	0.020	0.1	0.003
NO _x	NG Combustion	100	lb/10 ⁶ scf	3.348	14.7	0.422
CO	NG Combustion	84	lb/10 ⁶ scf	2.812	12.3	0.354
VOC	NG Combustion	5.5	lb/10 ⁶ scf	0.184	0.8	0.023
Lead	NG Combustion	0.0005	lb/10 ⁶ scf	1.67E-05	0.0	2.11E-06

Non-Criteria Pollutants with Significant Threshold						
Pollutant	Pollutant Source	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (TPY)	Potential Emissions (g/s)
PM	NG Combustion	See PM ₁₀	See PM ₁₀	0.254	1.114	3.21E-02
Beryllium	NG Combustion	<1.2E-5	lb/10 ⁶ scf	4.02E-07	0.000	5.06E-08
Mercury	NG Combustion	2.60E-04	lb/10 ⁶ scf	8.70E-06	0.000	1.10E-06

PM Grain Loading Standard ^b					
Pollutant	Pollutant Source	Potential Emissions (lb/hr)	Grain Load @ 3% Oxygen (gr/dscf)	PM Grain Standard ^b (gr/dscf)	Meets Standard?
PM	NG Combustion	0.254	0.005	0.015	yes

Notes:

(a) Emission factors from AP-42 Chapter 1.4, "Natural Gas Combustion", unless otherwise noted.

(b) IDAPA 58.01.01.677

Toxic Air Pollutant Emissions Boiler #2 (P105)

Combustion Source Characteristics		Stack Data	
Boiler Manufacturer	Superior Boiler Works, Inc.	Stack Height (ft)	38.0
Burner Model	Super Seminole 4000 (or Equivalent)	Stack Diameter (ft)	4.00
Input Heat Capacity (BTU/hr)	33,475,000	Exit Gas Temperature (°F)	350
Fuel	Natural Gas	Wet Actual Flow Rate (acfm)	10,548
Heating Value (BTU/scf)	1,000	Wet Standard Flow Rate (wscfm)	5,919
Max Hourly Fuel Consumption (scf/hr)	33,475	Dry Standard Flow Rate (dscfm)	4,859
Annual Fuel Consumption (scf/yr)	293,241,000	Grain Loading Flow Rate (dscfm)	6,590
Site Information		Stack Velocity (m/s)	4.26
Burley Barometric Pressure (mm Hg)	654.18	Fd (dscf stack gas/BTU)	0.00871
		Fw (wscf stack gas/BTU)	0.01061

Toxic Air Pollutants					
Pollutant	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Potential Emissions (g/s)	Emission Limit ^b (lb/hr)
Arsenic	2.00E-04	lb/10 ⁶ scf	6.70E-06	8.44E-07	1.50E-06
Barium	4.40E-03	lb/10 ⁶ scf	1.47E-04	1.86E-05	3.30E-02
Benzene	2.10E-03	lb/10 ⁶ scf	7.03E-05	8.86E-06	8.00E-04
Beryllium	<1.2E-5	lb/10 ⁶ scf	4.02E-07	5.06E-08	2.80E-05
Benzo(a)pyrene	<1.2E-6	lb/10 ⁶ scf	4.02E-08	5.06E-09	2.00E-06
Bis (2-ethylhexyl)phthalate	FNA	lb/10 ⁶ scf	FNA	FNA	2.80E-02
Cadmium	1.10E-03	lb/10 ⁶ scf	3.68E-05	4.64E-06	3.70E-06
Chromium	1.40E-03	lb/10 ⁶ scf	4.69E-05	5.90E-06	3.30E-02
Cobalt	8.40E-05	lb/10 ⁶ scf	2.81E-06	3.54E-07	3.30E-03
Copper	8.50E-04	lb/10 ⁶ scf	2.85E-05	3.59E-06	3.33E-01
Dibutylphthalate	FNA	lb/10 ⁶ scf	FNA	FNA	6.70E-02
Dichlorobenzene	1.20E-03	lb/10 ⁶ scf	4.02E-05	5.06E-06	2.00E+01
Ethylbenzene	FNA	lb/10 ⁶ scf	FNA	FNA	2.90E+01
Fluorene	2.80E-06	lb/10 ⁶ scf	9.37E-08	1.18E-08	1.33E-01
Formaldehyde	7.50E-02	lb/10 ⁶ scf	2.51E-03	3.16E-04	5.10E-04
Hexane	1.80E+00	lb/10 ⁶ scf	6.03E-02	7.59E-03	1.20E+01
Manganese	3.80E-04	lb/10 ⁶ scf	1.27E-05	1.60E-06	3.33E-01
Mercury	2.60E-04	lb/10 ⁶ scf	8.70E-06	1.10E-06	3.00E-03
Molybdenum	1.10E-03	lb/10 ⁶ scf	3.68E-05	4.64E-06	3.33E-01
Napthalene	6.10E-04	lb/10 ⁶ scf	2.04E-05	2.57E-06	3.33E+00
Nickel	2.10E-03	lb/10 ⁶ scf	7.03E-05	8.86E-06	2.70E-05
Pentane	2.60E+00	lb/10 ⁶ scf	8.70E-02	1.10E-02	1.18E+02
Phenol	FNA	lb/10 ⁶ scf	FNA	FNA	1.27E+00
Selenium	<2.4E-5	lb/10 ⁶ scf	8.03E-07	1.01E-07	1.30E-02
Toluene	3.40E-03	lb/10 ⁶ scf	1.14E-04	1.43E-05	2.50E+01
Vanadium	2.30E-03	lb/10 ⁶ scf	7.70E-05	9.70E-06	3.00E-03
o-Xylene	FNA	lb/10 ⁶ scf	FNA	FNA	2.90E+01
Zinc	2.90E-02	lb/10 ⁶ scf	9.71E-04	1.22E-04	6.67E-01

Notes:

(a) Emission Factors from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) IDAPA 58.01.01.585 and 586

* FNA - Factor Not Available

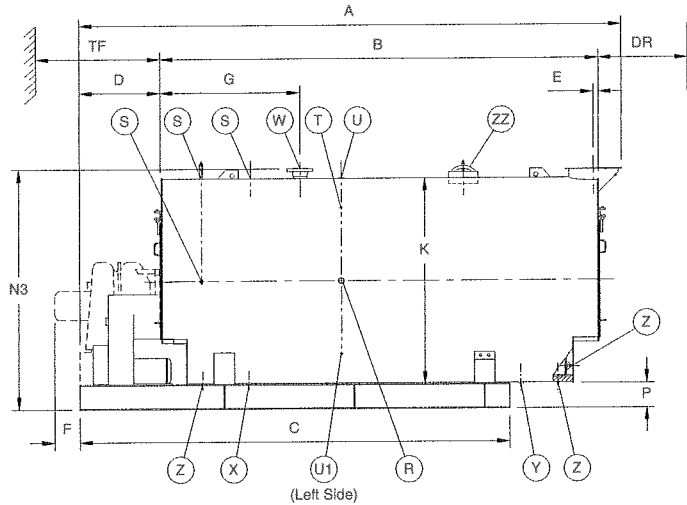
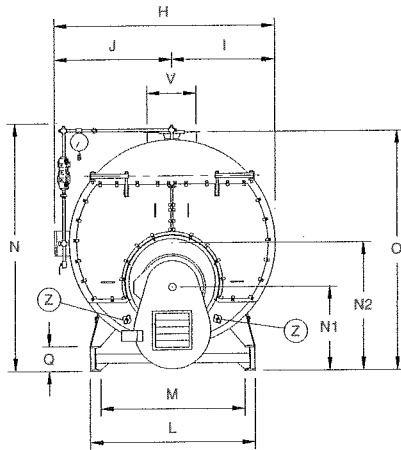
SUPER SEMINOLE

3 PASS WET BACK

70 THRU 1000 BoHP

5 SQ. FT. / BoHP

DIMENSIONAL DATA
STEAM BOILERS
15 AND 150 PSIG



FORM CATX68SF
ISSUED: 9-31-03

NOMINAL BOILER HORSEPOWER	70	80	100	125	150	200	250	300	350	400	500	600	700	750	800	900	1000	
UNIT MODEL NUMBER	350	400	500	625	750	1000	1250	1500	1750	2000	2500	3000	3500	3750	4000	4500	5000	
LENGTHS: Overall	A	158	171	197	183	205	210	241	270	278	263	305	301	297	305	319	324	343
Shell	B	124	137	183	148	170	180	191	220	226	211	253	248 1/2	244	252	266	262	281
Base	C	115	128	154	136 1/2	158 1/2	160	191	220	224	208	250	247 1/2	236	244	258	263	282
Front Plate To																		
Front Skid Extension	D	26	26	26	26	26	40	40	40	40	40	40	40	40	40	40	49	49
Rear Plate To																		
Center Line Of Stack	E	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Front Of Base To																		
End Of Burner	F																	
(GP)		-	-	-	9	9	5	5	-	-	-	-	-	-	-	-	13	12
(IC)		12	15	15	15	15	11	11	12	12	15	20	23	23				
Front Plate To																		
Nozzle	G	43	43	47	47	47	52	52	52	63	63	67	74	64	64	64	64	64
WIDTHS: Overall	H	73	73	73	80	80	90	90	90	96	107	107	113	124	124	124	130	130
Centerline To																		
Lagging	I	33	33	33	36 1/2	36 1/2	41 1/2	41 1/2	41 1/2	44 1/2	50	50	53	57	57	57	61	61
Water Column/Panel	J	40	40	40	43 1/2	43 1/2	48 1/2	48 1/2	48 1/2	51 1/2	57	57	60	67	67	67	69	69
Over Jacket	K	66	66	66	73	73	83	83	83	89	100	100	106	114	114	114	122	122
Base Width Outside	L	50	50	50	50 1/2	50 1/2	65 1/2	65 1/2	65 1/2	70 1/2	80	80	87	87	87	87	87	87
Base Width Inside	M	42	42	42	42 1/2	42 1/2	57 1/2	57 1/2	57 1/2	62 1/2	70	70	77	77	77	77	77	77
HEIGHTS: Overall	N	85	85	85	92	92	102	102	102	108	119	119	125	133	133	133	141	141
Centerline of Burner	N1	34	34	34	35 1/2	35 1/2	39	39	39	40	43	43	45	46	46	46	50	50
Centerline of Boiler	N2	45	45	45	48 1/2	48 1/2	53 1/2	53 1/2	53 1/2	56 1/2	62	62	65	69	69	69	75	75
Top of Steam Nozzle	N3	78 1/2	78 1/2	80 1/2	89 3/8	89 3/8	99 1/2	99 1/2	99 1/2	105 1/2	116 1/2	116 1/2	122 1/2	130 5/8	130 5/8	130 5/8	140 5/8	140 5/8
Base To Stack Outlet	O	81 1/2	81 1/2	81 1/2	89	89	99	99	99	105	116	116	122	130	130	130	140	140
Base To Lagging	P	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	14	14
Height Of Runner	Q	6	6	6	6	6	8	8	8	8	12	12	12	12	12	12	12	12
CONNECTIONS:																		
Feedwater-Right/Left	R	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2	2	2	2	2	2	2	2	2	2
Auxiliary Conn-Right/Top	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Surface Blowoff-Right	T	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Auxiliary Conn-Top	U	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Low Fire Hold(Left Side)	U1	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Flanged Stack Conn L.D.	V	15 7/8	15 7/8	15 7/8	17 7/8	17 7/8	19 7/8	19 7/8	19 7/8	23 7/8	23 7/8	23 7/8	25 7/8	25 7/8	25 7/8	25 7/8	25 7/8	25 7/8
HIGH PRESSURE																		
Steam Nozzle	W	3	3	4 1/4	4 1/4	4 1/4	6 1/4	6 1/4	6 1/4	6 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4	8 1/4
Blowdown Front	X	-	-	-	-	-	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2
Rear	Y	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2
LOW PRESSURE																		
Steam Nozzle	W	6"	6"	6"	6"	6"	8"	8"	10"	10"	12"	12"	12"	12"	12"	12"	12"	12"
Blowdown Front	X	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2
Rear	Y	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	2	2	2	2
ACCESS OPENINGS:																		
Handholes 3" x 4"	Z	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Manway 12" x 16"	ZZ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MINIMUM CLEARANCES**																		
Tube Removal Front	TF	90 1/2	103 1/2	129 1/2	114 1/2	136 1/2	123 1/2	154 1/2	183 1/2	183 1/2	168 1/2	210 1/2	203	198 1/2	206 1/2	220 1/2	216 1/2	235 1/2
Rear Door Swing Rear	DR	14	14	14	18	18	16	16	16	20	22	22	24	28	28	28	39	39

NOTE: * 150 PSIG RF FLANGE
† 300 PSIG RF FLANGE

NOTE: All Dimensions Are Approximate And May Be Used For Layout Only.
SUPERIOR BOILER WORKS, Inc Reserves The Right To Change
Dimensions Due To Product Revisions Or Job Requirements.
** Check Local, State And Federal Code.

SUPER SEMINOLE

3 PASS STEAM BOILER



BOILER WORKS, Inc
3524 EAST FOURTH ST. HUTCHINSON, KANSAS 67501 (620) 662-6693

FORM CAT76658
ISSUED: 9-31-05

RATINGS: STEAM 15/150 PSIG

Sea Level To 2000'

5 sq.ft./BoHP

NOMINAL BOILER HORSEPOWER	70	80	100	125	150	200	250	300	350	400	500	600	700	750	800	900	1000
UNIT MODEL NUMBER	350	400	500	625	750	1000	1250	1500	1750	2000	2500	3000	3500	3750	4000	4500	5000
OUTPUT MBH	2343	2678	3348	4184	5021	6695	8369	10043	11716	13390	16738	20085	23433	25106	26780	30128	33475
STEAM LBS/HR (#2)	2415	2760	3450	4312	5175	6900	8625	10350	12075	13800	17250	20700	24150	25875	27600	31050	34500
INPUT GAS (1,000 BTU) CU. FT.	2929	3348	4184	5230	6276	8369	10461	12553	14645	16738	20922	25106	29291	31383	33475	37659	41844
OIL (140,000 BTU) GAL.	20.91	23.91	29.88	37.35	44.83	59.77	74.72	89.66	104.60	119.55	149.44	179.33	209.21	224.16	239.10	269.00	298.88
OIL (150,000 BTU) GAL.	19.52	22.31	27.89	34.86	41.53	55.78	69.73	83.68	97.62	111.57	139.47	167.37	195.26	209.21	223.16	251.06	278.95

DATA:

HEATING SURFACE SQ. FT.	364	412	510	643	765	1022	1282	1525	1765	2019	2517	3017	3548	3783	4040	4541	5040
FURNACE VOLUME CU.FT. (#3)	18.93	22.51	29.66	34.26	42.39	52.18	68.81	84.37	95.32	115.17	148.70	171.45	183.76	192.05	206.57	236.99	259.82
STEAM STORAGE VOL. CU.FT.	13.21	14.96	18.44	20.64	24.34	27.98	34.53	40.66	49.04	70.17	86.59	102.64	124.10	128.81	137.07	151.43	164.02
DISENGAGING AREA SQ. FT.	28.18	31.90	39.33	39.21	46.25	48.01	59.24	69.75	76.57	84.50	104.27	109.99	118.16	122.65	130.51	136.78	148.16
WATER CAPACITY NWL GAL.	655	757	962	1047	1251	1381	1739	2074	2494	2783	3486	3607	4153	4289	4579	5245	5664
WATER WEIGHT NWL LBS.	5447	6297	7998	8710	10406	11485	14462	17247	20747	23149	28998	30000	34545	35673	38090	43629	47111
WATER CAPACITY FULL GAL.	754	869	1100	1202	1433	1590	1997	2378	2861	3308	4134	4375	5081	5252	5605	6378	6891
WATER WEIGHT FULL LBS.	6269	7228	9146	9994	11921	13227	16611	19777	23799	27515	34385	36386	42266	43688	46618	53051	57316
SHIPPING WEIGHT 15 PSIG (#4)	8400	9100	10400	11500	12900	17500	20300	23000	25800	29200	35300	39200	43100	44900	47200	51700	55800
SHIPPING WEIGHT 150 PSIG (#4)	9300	10000	11300	12800	14200	19400	22300	24900	28700	33200	38500	42800	46600	48300	50700	60400	65200

STANDARD FEATURES:

- Units Designed And Fabricated To ASME Boiler And Pressure Vessel Code Requirements.
Section IV-15 psig. Section I-150 psig Thru 250 psig.
- Insulated With 2"-8 Lb. Density Mineral Fiber Insulation.
- Jacket Material 22 Gauge Galvanized-Phosphate Coated Steel.
- Davited Doors: Front / Rear-All Units.
- Rear Access Plug: 17" Dia.-All Units.
- Handholes: 3" x 4" (5) All Units.
- Manway: 12" x 16" (1) All Units.
- Surface Blowdown Connections.
- Section I Boilers: Corrugated Furnace

STANDARD TRIM (BOILER)

- ASME Safety Valve(s).
- Water Column w/Water Level Gauge Glass, Try Cocks (As Req'd),
Low Water Cutoff/Pump Control, Blowdown Valve.
- Operating Pressure Control
- High Limit Pressure Control (Manual Reset).
- Firing Rate Control (Hi-Lo-Off Or Modulating Firing Only).
- Pressure Gauge w/Shutoff And Inspectors Gauge Cocks.
- Control Circuit Terminal Strips.
- Auxiliary Low Water Cutoff, Probe In Shell.

Notes:

- All Units Manufactured To UL Listing Procedures.
- Steam Output-Based On Steam From And At 212BF.
- Furnace Volume Is Furnace Only (Wet Backed Turnaround Not Included).
- Shipping Weights Are Based On Units With Natural Gas Burners-Weights Of Units For Air Atomized Oil Or Combination Gas/Oil Firing Will Be Higher.

Air Pollutant Emissions Emergency Generator

Combustion Source Characteristics

Generator Manufacturer	Cummins
Model	900DQFAC
Input Heat Capacity (MMBTU/hr) ^d	8.18
Break Horsepower (bhp)	1,490
Power Generation (ekW)	1,000
Fuel	Diesel
Heating Value (BTU/gal)	128,000
Max Hourly Fuel Consumption (gal/hr) ^d	63.9
Unlimited Annual Fuel Consumption (gal/yr)	559,764
Limited Annual Fuel Consumption (gal/yr)	31,950

Stack Data ^c

Stack Height (ft)	5.9
Stack Diameter (ft)	1.00
Exit Gas Temperature (°F)	500
Wet Actual Flow Rate (acfm)	2,971
Wet Standard Flow Rate (wscfm)	1,407
Dry Standard Flow Rate (dscfm)	1,253
Grain Loading Flow Rate (dscfm)	1,699
Stack Velocity (m/s)	19.21
Fd (dscf stack gas/BTU)	0.00919
Fw (wscf stack gas/BTU)	0.01032

Miscellaneous Support Data

Pressure at Standard Conditions (atm)	1
Temperature at Standard Conditions (K)	293
Ideal Gas Constant (atm-ft ³ /mol-K)	1.314
Burley Barometric Pressure (atm)	0.86

Criteria Pollutants				
Pollutant	Emission Factor ^a	Emission Factor Unit	Potential Emissions (lb/hr)	Limited Potential Emissions (TPY) ^b
PM ₁₀ (assume = PM)	0.11	g/bhp-hr	3.61E-01	0.09
SO ₂	0.10	g/bhp-hr	3.28E-01	0.08
NO _x	4.05	g/bhp-hr	13.30	3.33
CO	0.58	g/bhp-hr	1.91	0.48

Notes:

(a) Emission factors for PM, SO_x, CO, and NO_x supplied by the equipment manufacturer (Cummins).

Assumed worst-case exhaust emission data from equipment manufacturer.

(b) Limited to 500 hours of operation per year.

(c) Stack parameters were determined as follows: discharge temperature = conservatively assumed rated exhaust temp was reduced from 836°F down to 500°F to account for heat losses from the exhaust manifold, flowrate (wet actual) based on EPA Method 19 Fw factor (converted from standard conditions to actual conditions) this is conservative since the manufacturer claims that the flowrate will be 6,600 cfm, stack height = actual (details provided on construction drawings).

(d) Maximum fuel consumption from Cummins spec sheet (full standby), heat input capacity calculated by multiplying fuel heating value times the maximum fuel consumption rate.

Air Pollutant Emissions Emergency Generator

Combustion Source Characteristics

Genset Manufacturer	
Genset Model	900DQFAC
Engine Manufacturer	Cummins
Engine Model	QST30-G5 Nonroad 2
Break Horsepower (bhp)	1,490
Power Generation (kW - prime)	1,000
Fuel	Diesel
Max Hourly Fuel Consumption (gal/hr)	63.9
Controlled Fuel Consumption (gal/yr)	31,950.0
Heating Value (BTU/gal)	128,000
Heat Input Capacity (BTU/hr)	8,179,200

Toxic Air Pollutants				
Pollutant	Emission Factor ^a (lb/MMBtu)	Controlled Emissions (lb/hr) ^b	Controlled Emissions (ton/yr)	Emissions Limit (lb/hr)
Benzene	7.76E-04	3.62E-04	9.06E-05	8.0E-04
Toluene	2.81E-04	2.30E-03	5.75E-04	2.5E+01
Xylenes	1.93E-04	1.58E-03	3.95E-04	2.9E+01
Formaldehyde	7.89E-05	3.68E-05	9.21E-06	5.1E-04
Acetaldehyde	2.52E-05	1.18E-05	2.94E-06	3.0E-03
Acrolein	7.88E-06	6.45E-05	1.61E-05	1.7E-02
Naphthalene	1.30E-04	1.06E-03	2.66E-04	3.3E+00
Fluorene	1.28E-05	1.05E-04	2.62E-05	1.3E-01
Benzo(a)pyrene	2.57E-07	1.20E-07	3.00E-08	2.0E-06
Total PAH	2.12E-04	9.90E-05	2.47E-05	9.1E-05

Notes:

- (a) Emission factors from AP-42 Chapter 3.4, "Large Stationary Diesel and All Stationary Dual-fuel Engine"
- (b) Emission rates for pollutants for which AACC apply were reduced due to limited hours of operation of
- (c) Shaded values are AACC for carcinogenic pollutants, unshaded values are AAC for non-carcinogenic



**Power
Generation**

Exhaust Emission Data Sheet

900DQFAC

60 Hz Diesel Generator Set

Engine Information:

Model:	Cummins Inc. QST30-G5 NR2	Bore:	5.51 in. (139 mm)
Type:	4 Cycle, 50°V, 12 Cylinder Diesel	Stroke:	6.5 in. (165 mm)
Aspiration:	Turbocharged and Low Temperature aftercooled	Displacement:	1860 cu. in. (30.4 liters)
Compression Ratio:	14.7:1		
Emission Control Device:	Aftercooled (Air-to-Air)		

	1/4	1/2	3/4	Full	Full	
PERFORMANCE DATA	Standby	Standby	Standby	Standby	Prime	
BHP @ 1800 RPM (60 Hz)	331	661	992	1322	1202	
Fuel Consumption (gal/Hr)	17.3	32.1	47.5	63.9	57.7	
Exhaust Gas Flow (CFM)	2540	4160	5480	6950	6600	
Exhaust Gas Temperature (°F)	583	728	798	866	836	
EXHAUST EMISSION DATA						
HC (Total Unburned Hydrocarbons)	0.16	0.11	0.09	0.08	0.08	
NOx (Oxides of Nitrogen as NO2)	5.48	4.15	3.90	4.05	4.00	
CO (carbon Monoxide)	0.95	0.41	0.43	0.58	0.53	
PM (Particular Matter)	0.19	0.16	0.13	0.11	0.12	
SO2 (Sulfur Dioxide)	0.11	0.10	0.10	0.10	0.10	
Smoke (Bosch)	0.77	0.81	0.80	0.76	0.78	

All Values are Grams/HP-Hour, Smoke is Bosch #

TEST CONDITIONS

Data was recorded during steady-state rated engine speed (± 25 RPM) with full load ($\pm 2\%$). Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	46.5 Cetane Number, 0.035 Wt.% Sulfur; Reference ISO8178-5, 40CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.
Fuel Temperature:	99 \pm 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 \pm 9 °F
Barometric Pressure:	29.6 \pm 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here were taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



EPA Tier 2 Exhaust Emission Compliance Statement 900DQFAC 60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with U.S. EPA and California emission regulations under the provisions of 40 CFR 89, Nonroad (Mobile Off Highway) Tier 2 emissions limits when tested per ISO 8178 D2.

Engine Manufacturer: Cummins Inc
EPA Certificate Number: CEX-NRCI-07-07
Effective Date: 09/15/2006
Date Issued: 09/18/2006
EPA Nonroad Diesel Engine Family: 7CEXL030.AAD
CARB Executive Order: U-R-002-0368

Engine Information:

Model:	Cummins Inc QST30-G5 NR2	Bore:	5.51 in. (140 mm)
Engine Nameplate HP:	1490		
Type:	4 Cycle, 50°V, 12 Cylinder Diesel	Stroke:	6.5 in. (165 mm)
Aspiration:	Turbocharged and Low Temperature Aftercooled (Air-to-Air)	Displacement:	1860 cu. in. (30.5 liters)
Compression Ratio:	14.7:1		
Emission Control Device:	Turbocharged and Low Temperature Aftercooled(Air-to-Air)		

U.S. Environmental Protection Agency Nonroad Tier 2 Limits

(All values are Grams per HP-Hour)

<u>COMPONENT</u>	
NOx + HC (Oxides of Nitrogen as NO2 + Total Unburned Hydrocarbons)	4.77
CO (Carbon Monoxide)	2.61
PM (Particulate Matter)	0.15

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Generator Set Data Sheet	Model: DQFAC Frequency: 60 Fuel Type: Diesel
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Exhaust Emission Data Sheet:	EDS-1062
Emissions Compliance Sheet:	EPA-1096
Measured Sound Performance Data Sheet:	MSP-1037
Measured Cooling Performance Data Sheet:	MCP-155
Prototype Test Summary Data Sheet:	PTS-266
Standard Set-Mounted Radiator Cooling Outline:	0500-4391
Optional Remote Radiator Cooling Outline:	0500-4390

Fuel Consumption	Standby				Prime			
	kW (kVA)				kW (kVA)			
	900 (1125)				818 (1023)			
Ratings								
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full
US gph	17.3	32.1	47.5	63.9	16.8	29.4	43.3	57.7
L/hr	65.5	121.5	179.8	241.9	63.6	111.3	163.9	218.4

Engine	Standby Rating	Prime Rating	Continuous Rating
Engine Manufacturer	Cummins		
Engine Model	QST30-G5 NR2		
Configuration	Cast Iron, 60°V 12 cylinder		
Aspiration	Turbocharged and Low Temperature Aftercooled		
Gross Engine Power Output, kWm (bhp)	1112 (1490)	1007 (1350)	
BMEP at Set Rated Load, kPa (psi)	2155 (313)	1960 (284)	
Bore, mm (in.)	140 (5.51)		
Stroke, mm (in.)	165 (6.5)		
Rated Speed, rpm	1800		
Piston Speed, m/s (ft/min)	9.91 (1950)		
Compression Ratio	14.7:1		
Lube Oil Capacity, L (qt)	154 (162.8)	154 (162.8)	
Overspeed Limit, rpm	2100 ±50		
Regenerative Power, kW	82		
Fuel Flow			
Maximum Fuel Flow, L/hr (US gph)	568 (150)		
Maximum Fuel Inlet Restriction, kPa (in. Hg)	27 (8.0)		
Maximum Fuel Inlet Temperature, °C (°F)	66 (150)		
Air			
Combustion Air, m³/min (scfm)	81 (2880)	74 (2657)	
Maximum Air Cleaner Restriction, kPa (in. H ₂ O)	6.2 (25)		
Alternator Cooling Air, m³/min (cfm)	204 (7300)		
Exhaust			
Exhaust Gas Flow at Set Rated Load, m³/min (cfm)	195 (6950)	185 (6600)	
Exhaust Gas Temperature, °C (°F)	463 (866)	447 (836)	
Maximum Exhaust Back Pressure, kPa (in. H ₂ O)	6.7 (27)		

Standard Set-Mounted Radiator Cooling	Standby Rating	Prime Rating	Continuous Rating
Ambient Design, °C (°F)	50 (122)		
Fan Load, KW _m (HP)	43 (57)		
Coolant Capacity (with Radiator), L (US Gal.)	201 (53.2)		
Cooling System Air Flow, m ³ /min (scfm)	952 (34000)		
Total Heat Rejection, MJ/min (BTU/min)	43.9 (41660)	39.8 (37728)	
Maximum Cooling Air Flow Static Restriction, kPa (in. H ₂ O)	0.12 (0.5)		
Maximum Fuel Return Line Restriction, kPa (in. Hg)	67.5 (20)		

Optional Remote Radiator Cooling ¹	Standby Rating	Prime Rating	Continuous Rating
Max Flow Rate @ Max Friction Head, Jacket Water Circuit, L/min (US Gal/min)	992 (262)		
Max Flow Rate @ Max Friction Head, Aftercooler Circuit, L/min (US Gal/min)	303 (80)		
Heat Rejected, Jacket Water Circuit, MJ/min (BTU/min)	21 (19925)	19.65 (18634)	
Heat Rejected, Aftercooler Circuit, MJ/min (BTU/min)	15.7 (14885)	13.5 (12823)	
Total Heat Radiated to Room, MJ/min (BTU/min)	6.1 (5753)	5.6 (5301)	
Maximum Friction Head, Jacket Water Circuit, kPa (psi)	69 (10)		
Maximum Friction Head, Aftercooler Circuit, kPa (psi)	48 (7)		
Maximum Static Head, Jacket Water Circuit, m (ft)	14 (46)		
Maximum Static Head, Aftercooler Circuit, m (ft)	14 (46)		
Maximum Jacket Water Outlet Temp, °C (°F)	104 (220)	100 (212)	
Maximum After-Cooler Inlet Temp @ 25°C (77°F) Ambient, °C (°F)	49 (120)		
Maximum After-Cooler Inlet Temp, °C (°F)	71 (160)	66 (150)	
Maximum Fuel Return Line Restriction, kPa (in. Hg)	67.5 (20)		

Weights ²	
Unit Dry Weight kgs (lbs.)	7375 (16254)
Unit Wet Weight kgs (lbs.)	7672 (16910)

Notes:

1. For non-standard remote installations contact your local Cummins Power Generation representative
2. Note: Weights represent a set with standard features. See outline drawing for weights of other configurations

Derating Factors		
Standby	Engine power available up to 1448 m (4750 ft) at ambient temperatures up to 40°C (104°F). Above these elevations, derate at 3.5% per 305 m (1000 ft), and 7% per 10° C (18°F)	
Prime	Engine power available up to 1448 m (4750 ft) at ambient temperatures up to 40°C (104°F). Above these elevations, derate at 3.5% per 305 m (1000 ft), and 7% per 10°C (18°F).	
Ratings Definitions		
Standby:	Prime (Unlimited Running Time):	Base Load (Continuous):
Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. This rating is applicable to installations served by a reliable normal utility source. This rating is only applicable to variable loads with an average load factor of 80 percent of the standby rating for a maximum of 200 hours of operation per year and a maximum of 25 hours per year at 100% of its standby rating. The standby rating is only applicable to emergency and standby applications where the generator set serves as the back up to the normal utility source. No sustained utility parallel operation is permitted with this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally Rated.	Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time. (Equivalent to Prime Power in accordance with ISO8528 and Overload Power in accordance with ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.	Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating. (Equivalent to Continuous Power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514). This rating is not applicable to all generator set models.

Alternator Data

Voltage	Connection ¹	Temp Rise Degrees C	Duty ²	Single Phase Factor ³		Max Surge kVA ⁴	Alternator Data Sheet	Feature Code
277/480	12-lead	125/105	S/P	N/A	918	3313	310	B246
120/208- 139/240	12-lead	125/105	S/P	N/A	916	3866	311	B252
240/416- 277/480	12-lead	125/105	S/P	N/A	916	3866	311	B252
110/190- 139/240	12-lead	125/105	S/P	N/A	919	4234	312	B258
220/380- 277/480	12-lead	125/105	S/P	N/A	919	4234	312	B258
277/480	Wye, 3-phase	125/105	S/P	N/A	918	3313	310	B276
220/380- 277/480	Wye, 3-phase	125/105	S/P	N/A	919	4234	312	B282
220/380- 277/480	Wye, 3-phase	105/80	S/P	N/A	920	4602	330	B283
220/380- 277/480	Wye, 3-phase	80	S	N/A	920	4602	330	B284
220/380- 277/480	Wye	125/105	S/P	N/A	916	3866	311	B288
347/600	3-phase	125/105	S/P	N/A	923	3866	311	B300
347/600	3-phase	105/80	S/P	N/A	923	3866	311	B301
347/600	3-phase	80	S	N/A	925	4234	312	B302

Notes:

- Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor³. All single phase ratings are at unity power factor.
- Standby (S), Prime (P) and (C) Continuous ratings.
- Factor for the *Single Phase Output from Three Phase Alternator* formula listed below.
- Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

Formulas for calculating full load currents:

Three Phase Output	Single Phase Output
$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$	$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$



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See your distributor for more information.

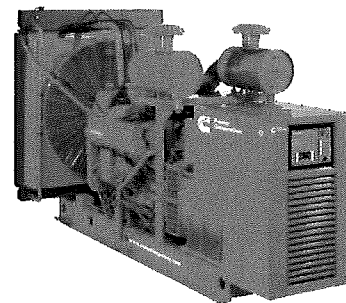
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Important: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

Diesel generator set

QST30 series engine

EPA emissions



> **Specification sheet**
680 kW - 1000 kW 60 Hz

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**Power
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Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary and prime power applications.



This generator set is designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.

U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 2.

Features

Cummins® heavy-duty engine - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Permanent magnet generator (PMG) - Offers enhanced motor starting and fault clearing short-circuit capability.

Control system - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DQFAA	750 (938)		680 (850)				D-3329	
DQFAB	800 (1000)		725 (907)				D-3330	
DQFAC	900 (1125)		818 (1023)				D-3331	
DQFAD	1000 (1250)		900 (1125)				D-3332	

Generator set specifications

Governor regulation class	ISO8328 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 801.2 through IEC 801.5; MIL STD 461C, Part 9

Engine specifications

Design	4 cycle, V-block, turbocharged and low temperature aftercooled
Bore	140 mm (5.51 in)
Stroke	165.0 mm (6.5 in)
Displacement	30.5 litres (1860 in ³)
Cylinder block	Cast iron, 60°V 12 cylinder
Battery capacity	1800 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel
Fuel filter	Triple element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Four spin-on, combination full flow filter and bypass filters
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H on low and medium voltage, Class F on high voltage
Standard temperature rise	150 °C standby
Exciter type	PMG (permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

Available voltages

60 Hz line-neutral/line-line	50 Hz line-neutral/line-line
<ul style="list-style-type: none"> • 120/208 • 220/380 • 240/416 • 347/600 • 139/240 • 230/400 • 277/480 	

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- ☐ 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- ☐ 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)

Control panel

- ☐ 120/240 V, 100 W control anti-condensation space heater
- ☐ Paralleling configurations

- ☐ Remote fault signal package
- ☐ Run relay package

Alternator

- ☐ 80 °C rise alternator
- ☐ 105 °C rise alternator
- ☐ 125 °C rise alternator
- ☐ 120/240 V, 300 W, anti-condensation heater
- ☐ Temperature sensor - RTDs, 2/phase
- ☐ Temperature sensor - alternator bearing RTD
- ☐ Differential current transformers

Exhaust system

- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer
- ☐ Critical grade exhaust silencer

Cooling system

- ☐ Remote radiator cooling

Generator set

- ☐ AC entrance box
- ☐ Batteries

- ☐ Battery rack w/hold-down - floor standing
- ☐ Circuit breaker - set mounted
- ☐ Disconnect switch - set mounted
- ☐ PowerCommand Network
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ 2 year warranty
- ☐ 5 year warranty
- ☐ 10 year major components

* Note: Some options may not be available on all models - consult factory for availability.

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S-1508c (8/07)



**Power
Generation**

Control system

Operator panel features

Analog AC metering panel - Provides color-coded display of generator set output voltage, current, frequency, power factor and kW. All phases of voltage and current are simultaneously displayed. Easy to see output status from a distance.

Graphical data display - Allows operator to view all engine and alternator data; perform operator adjustments for speed, voltage and time delays; view fault history; and set up and adjust the generator set (set up requires password access). A portion of the display is allocated to display system status including alarm and shutdown conditions. Display is controlled by sealed membrane switches. Up to 9 lines of data can be displayed with approximately 26 characters per line.

LED status lamps - The status lamps indicate remote start command (green), not in auto (red-flashing), warning (amber) and shutdown (red).

Mode selector switch - Off/manual/auto and run/stop switches allow remote automatic starting or manual starting from the operator panel. Panel includes an LED lamp to indicate manual mode operation.

Exerciser switch - Automated exercise function in the control allows an operator to initiate an exercise period and have it automatically completed by the control.

Fault reset switch - Allows the operator to reset the control after a warning or shutdown condition. LED lamp with switch indicates that a fault is present on the system.

Panel lamps and switch - Operator panel can be illuminated by a series of high-intensity LED lamps controlled by a membrane switch on the panel. Panel lamps include a time delay to automatically switch off after a preset time period.

Emergency stop switch - Provides positive and immediate shutdown of the generator set on operation.

Construction - Operator panel is a sealed design with membrane switches for most functions. Mechanical switches are oil-tight design. Plug interfaces are provided to the generator set control system. Display panel labeling is configurable for language.

Standard control functions

- Integrated Isochronous governing and fuel control system.
- Integrated 3-phase sensing voltage regulation system with automatic single and three phase fault regulation.
- Integrated AC protective functions include over/under voltage, short-circuit, overcurrent (warning and shutdown) and overload.
- Integrated engine management system including configurable cycle-cranking functions and configurable start sequence.
- Comprehensive warning and shutdown protection including customer configurable warning and shutdown conditions.
- Comprehensive data displays including 3-phase AC voltage, current, power factor, kW and kVA; engine oil pressure, coolant temperature, DC volts and other service functions; operating history (load and fault conditions) and system setup information.

Options

- ☐ Integrated digital paralleling controls including options for semi-automatic and automatic (isolated bus) applications.
- ☐ LonMark compliant network interface.
- ☐ Control anti-condensation heater.
- ☐ Key-type mode select switch.
- ☐ Relay outputs for genset running, common warning and common shutdown.
- ☐ Exhaust temperature alarm.
- ☐ Alternator temperature alarm(s).
- ☐ Centinel™ lube oil burn system.
- ☐ Power transfer control function to allow generator set to control remote power circuit breakers for open, fast closed or soft (ramping) power transfer from a utility source to the genset (2 minute maximum fail-to-disconnect timer).



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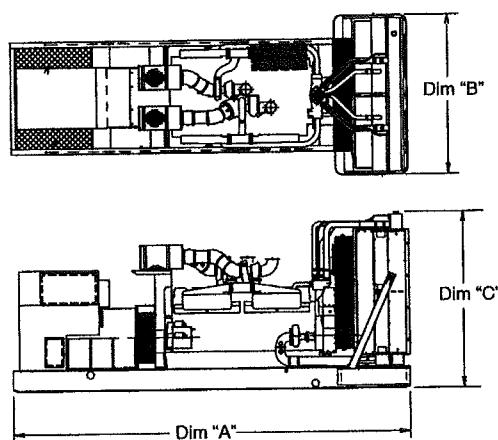
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Ratings definitions

Standby:

Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. This rating is applicable to installations served by a reliable normal utility source. This rating is only applicable to variable loads with an average load factor of 80 percent of the standby rating for a maximum of 200 hours of operation per year and a maximum of 25 hours per year at 100% of its standby rating. The standby rating is only applicable to emergency and standby applications where the generator set serves as the back up to the normal utility source. No sustained utility parallel operation is permitted with this rating (equivalent to fuel stop power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.



Prime (unlimited running time):

Applicable for supplying power in lieu of commercially purchased power. Prime power is the maximum power available at a variable load for an unlimited number of hours. A 10% overload capability is available for limited time (equivalent to prime power in accordance with ISO8528 and overload power in accordance with ISO3046, AS2789, DIN6271 and BS5514). This rating is not applicable to all generator set models.

This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Base load (continuous):

Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating (equivalent to continuous power in accordance with ISO8528, ISO3046, AS2789, DIN6271 and BS5514). This rating is not applicable to all generator set models.

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)	Set weight* w/tank dry kg (lbs)	Set weight* w/tank wet kg (lbs)
DQFAA	4333 (170.6)	1999 (78.7)	2352 (92.6)	6673 (14707)	6971 (15363)		
DQFAB	4333 (170.6)	1999 (78.7)	2352 (92.6)	6696 (15199)	7194 (15855)		
DQFAC	4333 (170.6)	1999 (78.7)	2352 (92.6)	7375 (16254)	7672 (16910)		
DQFAD	4333 (170.6)	1999 (78.7)	2352 (92.6)	7633 (16824)	7931 (17480)		

* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

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Attachment 2

Updated Emission Inventory

Emission Inventory
High Desert Milk
Burley, Idaho

Pollutant	Milk Dryer P101		Fluid-bed P102		Powder Storage P103		Boiler #1 P104		Boiler #2 P105		Emergency Generator		Total	EL	Total
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(lb/hr)	(ton/yr)
PM ₁₀	10.6	46.2	1.1	4.7	0.1	0.5	0.25	1.1	0.25	1.1	0.36	0.1	12.6		53.8
SO ₂	0.019	0.1					0.02	0.1	0.02	0.09	0.33	0.1	0.4		0.3
NO _x	1.5	6.4					3.35	14.7	3.35	14.7	13.3	3.3	21.5		39.1
CO	11.9	52.2					2.81	12.3	2.81	12.3	1.9	0.5	19.4		77.3
VOC	0.18	0.8					0.18	0.8	0.18	0.8			5.4E-01		2.4
Lead	1.6E-05	0.0					1.7E-05	0.00	1.7E-05	7.3E-05			4.9E-05		0.0
Acetaldehyde											1.2E-05	5.2E-05	1.2E-05	3.0E-03	0.0
Acrolein											6.4E-05	2.8E-04	6.4E-05	1.7E-02	0.0
Arsenic	6.4E-06	0.0					6.7E-06	0.0	6.7E-06	0.0			2.0E-05	1.5E-06	0.0
Benzene	6.7E-05	0.0					1.3E-04	0.0	1.3E-04	0.0	3.6E-04	1.6E-03	6.9E-04	8.0E-04	0.0
Benzo(a)pyrene	3.8E-08	0.0					7.4E-08	0.0	7.4E-08	0.0	1.2E-07	5.3E-07	3.1E-07	2.0E-06	0.0
Cadmium	3.5E-05	0.0					3.7E-05	0.0	3.7E-05	0.0			1.1E-04	3.7E-06	0.0
Fluorene	8.9E-08	0.0					1.7E-07	0.0	1.7E-07	0.0	1.0E-04	4.6E-04	1.1E-04	1.3E-01	0.0
Formaldehyde	2.4E-03	0.0					2.5E-03	0.0	2.5E-03	0.0	3.7E-05	1.6E-04	7.4E-03	5.1E-04	0.0
Naphthalene	1.9E-05	0.0					3.8E-05	0.0	3.8E-05	0.0	1.1E-03	4.7E-03	1.2E-03	3.3E+00	0.0
Nickel	6.7E-05	0.0					7.0E-05	0.0	7.0E-05	0.0			2.1E-04	2.7E-05	0.0
Toluene	1.1E-04	0.0					2.1E-04	0.0	2.1E-04	0.0	2.3E-03	1.0E-02	2.8E-03	2.5E+01	0.0
Total PAH											9.9E-05	4.3E-04	9.9E-05	9.1E-05	0.0
Xylenes											1.6E-03	6.9E-03	1.6E-03	2.9E+01	0.0

(Revised 2-14-08)